GT9271

againstMIDof10Point capacitive touch chip

Rev.00—2013year09moon04day

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1.Overview

GT9271is designed for7”~10.1”A new generation of design10Point capacitive touch solution, with32drive channels and20sensing channels to meet higher touch precision requirements.

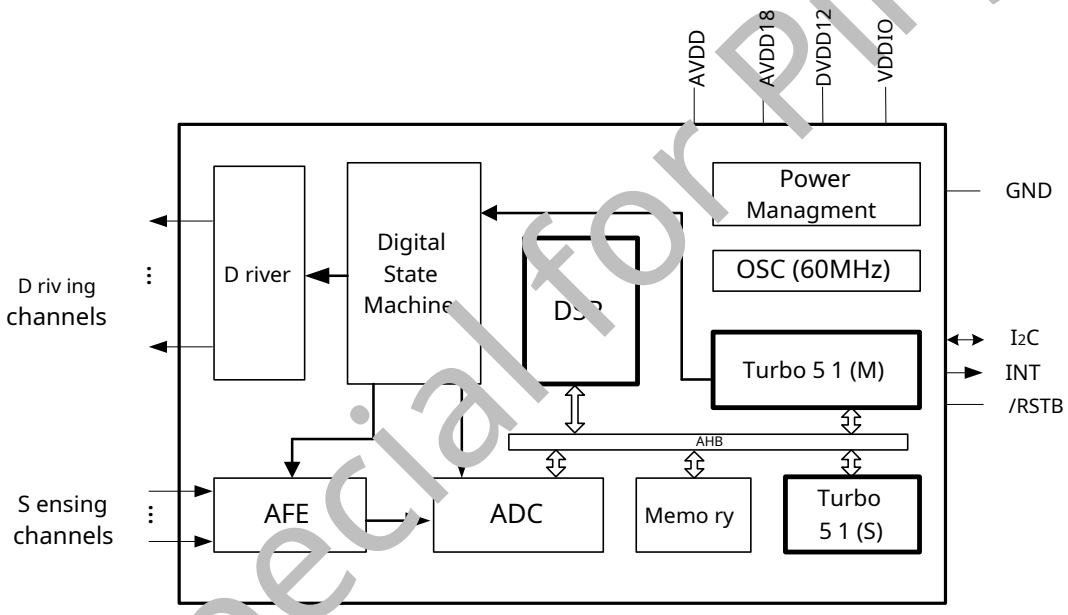
GT9271can be recognized at the same time10The real-time accurate position, movement trajectory and touch area of each touch point. And according to the needs of the main control, the touch information of the corresponding points can be read.

2.Features

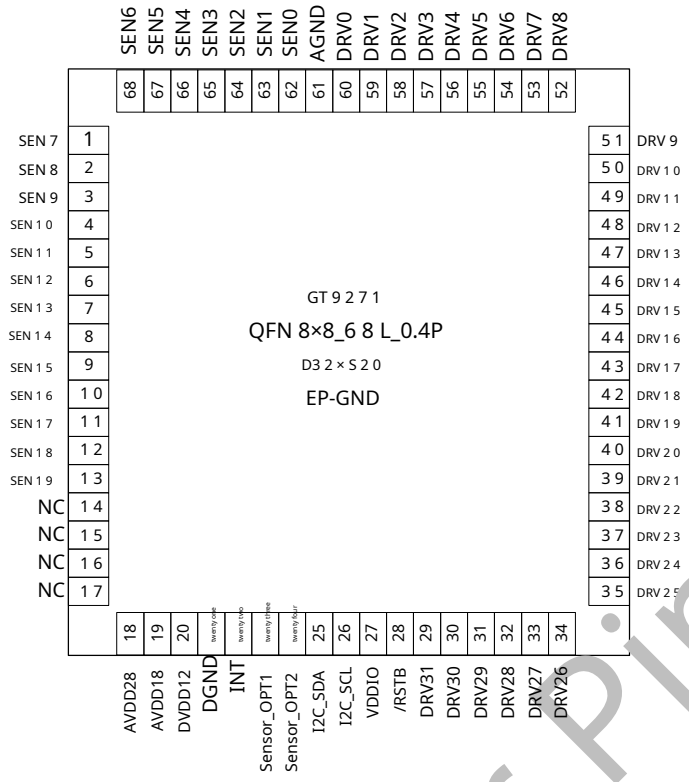
- Built-in capacitance detection circuit and high performanceMPU
  - Touch scan frequency:100Hz
  - Real-time output of touch point coordinates
  - Unified software version for capacitive screens of various sizes
  - Single power supply, built-in1.8V LDOs
  - FlashProcess, support online programming
- Capacitive screen sensor
  - Detection channel:32(drive channel)*20(sensing channel)
  - Capacitive screen size range:7"~10.1"
  - supportFPCKey design
  - Also supportsITOglass andITO Film
  - Cover LensThickness Support:
  - 0.7mm≦Glass≦2mm,0.5mm≦Acrylic≦1.2mm
  - supportOGSfull fit
- Environmental adaptability
  - Initialize auto-calibration
  - Automatic temperature drift compensation
  - Operating temperature:-40°C~+85°C, humidity: ≦95%RH
  - Storage temperature:-60°C~+125°C, humidity: ≦95%RH
- Communication Interface
  - standard I2C communication Interface
  - Slave working mode
  - support1.8V~3.3Vinterface level
- Response time
  - Green mode: <48ms
  - Sleep mode: <200ms
  - Initialization: <200ms

- voltage:
  - Single power supply:2.8V~3.3V
- Power Ripple:
  - Vpp≦50mV
- Package:68 pins,8mm*8mm QFN
- Application Development Support Tools
  - Touch screen module parameter detection and automatic generation of configuration parameters
  - Touch screen module performance comprehensive test tool
  - Module mass production test tool
  - Main control software development reference driver code and documentation guidance

3.Chip schematic



4.Pin Definition



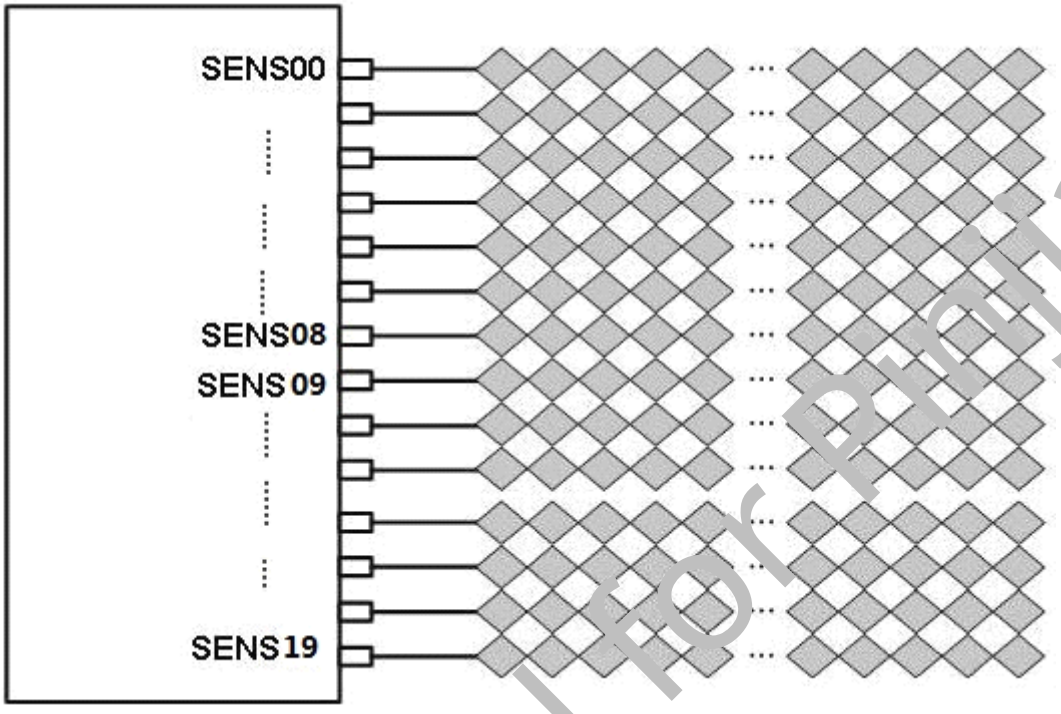
pin number.	name	Function description	Remark
1~13	SENS7~SENS19	Touch analog signal input	
14~17	NC	dangling	
18	AVDD28	Analog Power Positive	catch2.2uFFilter capacitor
19	AVDD18		catch2.2uFFilter capacitor
20	DVDD12		catch2.2uFFilter capacitor
twenty one	DGND	digital signal ground	
twenty two	INT	interrupt signal	
twenty three	Sensor_OPT1	Module identification port	
twenty four	Sensor_OPT2	Module identification port (optional)	External pull-down required
25	I2C_SDA	I2Cdata signal	
26	I2C_SCL	I2Cclock signal	
27	VDDIO	GPIOlevel control	catch2.2uFFilter capacitor, floating: 1.8V catchAVDD:AVDD
28	/RSTB	System reset pin	external10KPull up, pull down to reset
29~60	DRV31~DRV0	drive signal output	
61	AGND	analog power ground	
62~68	SENS0~SENS6	Touch analog signal input	

5.Sensor Design

5.1.Sensing channel arrangement

SENS0~SENS19Yes20A capacitance detection input channel, directly connected to the touch screen module20inductionITOchannel is connected. Induction on the moduleITOThe channels are connected to the chip'sSENS0toSENS19. likeITOThe channel is less than the chip detection channel, please refer to "Channel Selector" to select.

- Example of Arrangement: InductionITOThe channels are connected to the chip in sequenceSENS0toSENS19.



5.2.Drive channel arrangement

DRV0~DRV31Yes32A capacitance detection drive signal output channel, which is directly connected with the touch screen module32indivualITOdrive channel is connected. For the drive line, please select the channel and arrange the channel according to the "Channel Selector". After determining the arrangement method, you need to configureGT9271 The relevant registers of the chip are used to ensure that the logical position relationship of each drive channel is consistent with the physical position relationship, so that the output coordinates match the physical coordinates.

SensorFor more detailed rules of design, please refer to the specificlayoutguide.

5.3.Sensor Design Parameter Requirements

DITO

	GT9271
Drive Channel Trace Impedance	≦3KΩ
Drive channel impedance	≦10KΩ
Sense Channel Trace Impedance	≦10KΩ
Sensing channel impedance	≦40KΩ

node capacitance	≦4pF

SITO

	GT9271
Drive Channel Trace Impedance	≦3KΩ
Drive channel impedance	≦10KΩ
Sense Channel Trace Impedance	≦10KΩ
Sensing channel impedance	≦10KΩ
node capacitance	≦4pF

In order to ensure the consistency and uniformity of data on the entire screen, it is necessary to control the impedance of the traces to meet the requirements in the above table. For specific requirements, please refer toGoodix of"SensorDesign Specifications.

In addition, when the driving trace and the sensing trace are adjacent and parallel, a ground wire needs to be inserted between the two, and the width of the ground wire is at least twice the width of the channel trace, and the minimum shall not be less than0.2mm.

5.4.touch key design

GT9271support4There are two ways to realize the touch button:

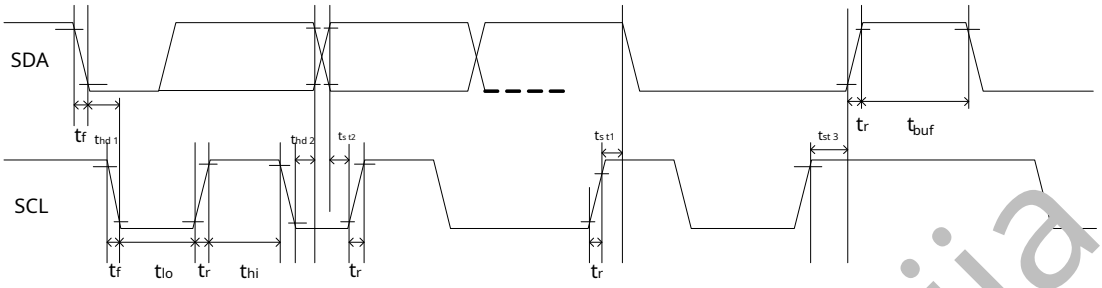
SensorExpansion method: The drive channel is used as the button common terminal, and a drive channel is connected to4root independent4button. The drive channel used as a key cannot be multiplexed with the driver on the screen, but the sensing channel used as a key must be multiplexed with the drive on the screen;

FPCDesign method: take out a separate drive channel and4bar sensing channel formation4button,4Sensing channel and screen body part. reuse.FPCof sensorThe pattern needs to be specially designed

6. I2Ccommunication

6.1.I2Ccommunication

GT9271provide standardI2Ccommunication interface, bySCLandSDAwith the LordCPUto communicate. in the systemGT9271Always act as a slave device, all communication is from the masterCPUinitiated, the recommended communication speed is400Kbpsor below. its supportedI2C The hardware circuit support timing is as follows:



Test Conditions1:1.8VCommunication Interface,400KbpsCommunication speed, pull-up resistor2K

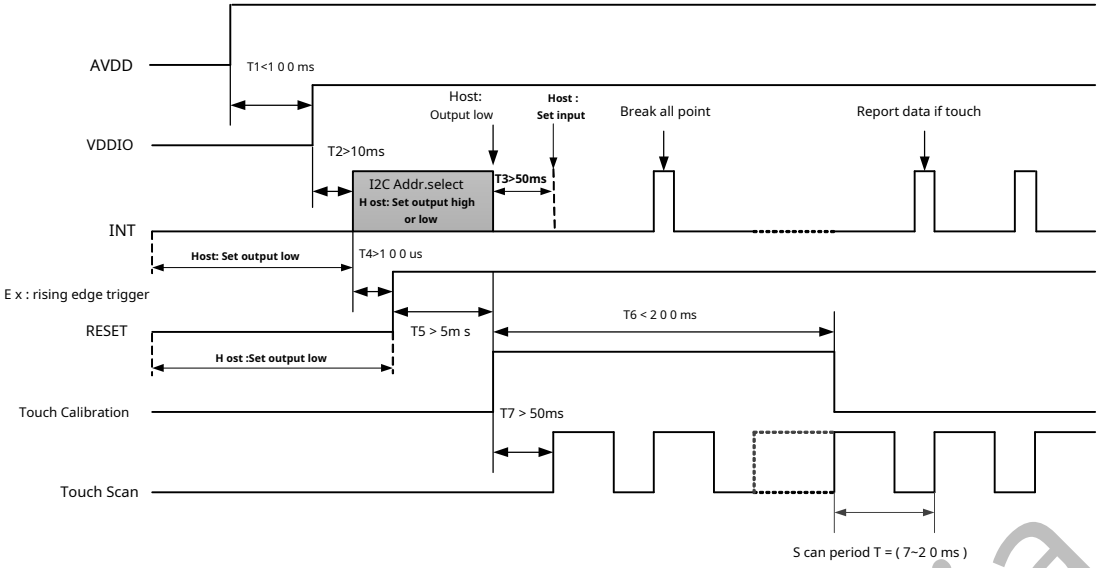
Parameter	Symbol	Min.	Max.	Unit
SCL low period	t_{lo}	1.3	-	us
SCL high period	t_{hi}	0.6	-	us
SCL setup time for START condition	t_{st1}	0.6	-	us
SCL setup time for STOP condition	t_{st3}	0.6	-	us
SCL hold time for START condition	t_{hd1}	0.6	-	us
SDA setup time	t_{st2}	0.1	-	us
SDA hold time	t_{hd2}	0	-	us

Test Conditions2:3.3VCommunication Interface,400KbpsCommunication speed, pull-up resistor2K

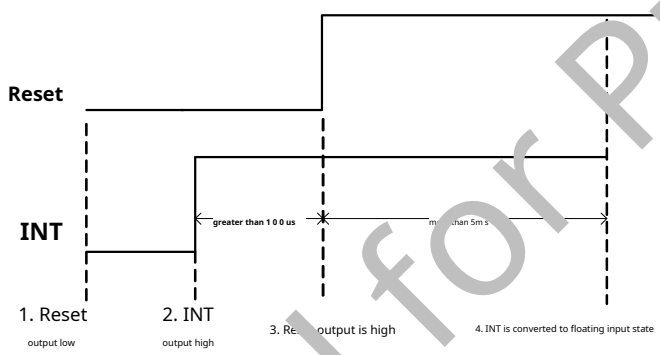
Parameter	Symbol	Min.	Max.	Unit
SCL low period	t_{lo}	1.3	-	us
SCL high period	t_{hi}	0.6	-	us
SCL setup time for START condition	t_{st1}	0.6	-	us
SCL setup time for STOP condition	t_{st3}	0.6	-	us
SCL hold time for START condition	t_{hd1}	0.6	-	us
SDA setup time	t_{st2}	0.1	-	us
SDA hold time	t_{hd2}	0	-	us

GT9271ofI2CThere are two sets of slave device addresses, which are0xBA/0xBBand0x28/0x29. The master controls during power-on initialization ResetandINTThe setting method and timing diagram are as follows:

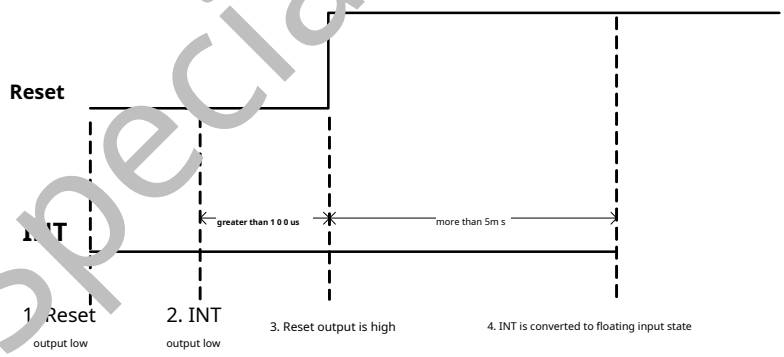
Power-on sequence diagram:



set address to0x28/0x29timing:



set address to0xBA/0xBBtiming:



a)data transmission

(with the device address as0xBA/0xBBexample)

Communication is always by the mainCPUInitiate, the valid initiating signal is: inSCLkeep as "1"hour,SDAHappened by "1"arrive"0"jump. The address information or data stream is transmitted after the start signal.

All connections inI_2CThe slave devices on the bus must detect the data sent after the start signal on the bus.8bit address information and make

Respond correctly. When receiving address information that matches itself,GT9271in the9clock cycles, theSDAChange it to the output port, and place the "0", as a response signal. If you receive address information that does not match your0XBAor0XBB,GT9271 will remain idle.

SDAdata on the mouth9clock cycle serial transmission9Bit data:8bit significant data plus1acknowledgment signal sent by the receiver ACKor non-response signalNACK. data transfer inSCLfor"1"valid when.

When the communication is completed, by the masterCPUSend a stop signal. The stop signal is whenSCLfor"1"hour,SDAStatus by "0"arrive"1" jump.

b)rightGT9271write operation

(with the device address as0xBA/0xBBexample)

Write Operation Timing Diagram

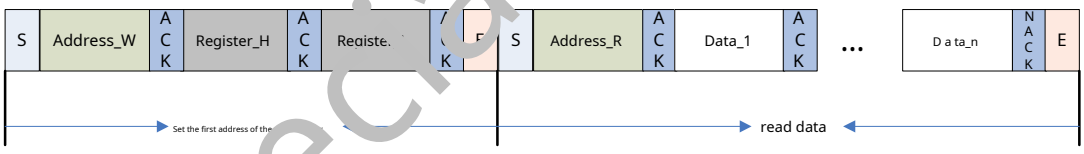
Main picture aboveCPUrightGT9271Flowchart of the write operation performed. First LordCPUGenerate a start signal, then send address information and read and write bit information"0"Indicates a write operation:0XBA.

After receiving the response, the masterCPUsend register16bit address, followed by8Bit data content to be written to the register.

GT9271The address pointer of the register is automatically incremented after a write operation.1, so when the mainCPUWhen it is necessary to write operations to registers with consecutive addresses, they can be continuously written in one write operation. The write operation is complete, the masterCPUSend a stop signal to end the current write operation.

c)rightGT9271read operation

(with the device address as0xBA/0xBBexample)



Read Operation Timing Diagram

Main picture aboveCPUright GT9271 flowchart of the read operation performed. First LordCPUGenerate a start signal, then send device address information and read and write bit information"0"Indicates a write operation:0XBA.

After receiving the response, the masterCPUsend the first register16Bit address information to set the register address to read. After receiving the response, the masterCPUResend the start signal once, and send the read operation:0XBB. After receiving the response, the masterCPUStart reading data.

GT9271It also supports continuous read operations, and the default is to read data continuously. hostCPUevery time you receive aByteAfter the data, a response signal needs to be sent to indicate successful reception. After receiving the last requiredByteAfter the data, the mainCPUSend "No Reply Signal" NACK", and then send a stop signal to end the communication.

6.2. GT9271register information

a)real-time commands

(Write Only)

Addr	name	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
0x8040	Command	0: read coordinate status 1: difference original value 2: software reset 3: Benchmark update (internal testing)4: Reference calibration (internal test)5:off screen 6: Enter charging mode 7: Exit charging mode 0xAA:ESDThe protection mechanism is used, and is periodically written by the driver0xAAAnd periodically read to check the rest of the values are invalid							
0x8041	ESD_Check	ESDThe protection mechanism is used, cleared at initialization, and then written by the driver0xAAand periodically read and check							

b)configuration information

(R/W)

register	Config Data	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
0x8047	Config_ Version	The version number of the configuration file (the newly issued configuration version number is greater than the original version, or equal to the original version number but the configuration content has changed When saving, the version number version normal range: 'A'~'Z',send0x00 then initialize the version number to 'A')							
0x8048	X Output Max (Low Byte)	XCoordinate output maximum							
0x8049	X Output Max (High Byte)								
0x804A	Y Output Max (Low Byte)	YCoordinate output maximum							
0x804B	Y Output Max (High Byte)								
0x804C	Touch Number	Reserved				The upper limit of the number of output contacts:1~10			
0x804D	Module_ Switch1	Reserved		Stretch_rank		X2Y (X,Ysit standard exchange)	Sito (software noise reduction)	INTTrigger method 00: rising edge trigger 01: falling edge trigger 02: low level query 03: High level query	
0x804E	Module_ switch2	Reserved							Touch _key
0x804F	Shake_Count	Reserved				Number of finger presses/releases to debounce			
0x8050	Filter	First_Filter		Normal_Filter(The original coordinate window filter value, the coefficient is4)					
0x8051	Large_Touch	The number of touch points in a large area							
0x8052	Noise_ Reduction	Reserved				Noise cancellation value (factor is1,0-15efficient)			
0x8053	Screen_ Touch_Level	On-screen touch point threshold from scratch							
0x8054	Screen_ Leave_Level	The threshold from presence to absence of touch points on the screen							
0x8055	Low_Power_ Control	Reserved				into the low-power time (0~15s)			
0x8056	Refresh_Rate	Reserved				Coordinate reporting rate (period is5+N ms)			

0x8057	x_threshold	Reserved			
0x8058	y_threshold				
0x8059	X_Speed_Limit	Reserved			
0x805A	Y_Speed_Limit				
0x805B	Space	The blank area of the top border (with32is the coefficient)		The blank area of the lower border (with32is the coefficient)	
0x805C		white space in the left border (with32is the coefficient)		white space on the right border (with32is the coefficient)	
0x805D	Mini_Filter	Reserved		small during scribingfilterset, min limit to 4	
0x805E	Stretch_R0	stretch interval1coefficient			
0x805F	Stretch_R1	stretch interval2coefficient			
0x8060	Stretch_R2	stretch interval3coefficient			
0x8061	Stretch_RM	The base number of each stretch interval			
0x8062	Drv_GroupA_Num	All_Driving	Reserved	Driver_Group_A_number	
0x8063	Drv_GroupB_Num	Reserved	Dual_Freq	Driver_Group_B_number	
0x8064	Sensor_Num	Sensor_Group_B_Number		Sensor_Group_A_Number	
0x8065	FreqA_factor	drive groupAThe driving frequency multiplication factor ofGroupA_Frequence=Multiplication factor* Fundamental frequency			
0x8066	FreqB_factor	drive groupBThe driving frequency multiplication factor ofGroupB_Frequence =Multiplication factor* Fundamental frequency			
0x8067	Pannel_BitFreqL	drive groupA,Bthe fundamental frequency (1526HZ<fundamental frequency<14600Hz)			
0x8068	Pannel_BitFreqH				
0x8069	NC	Reserved			
0x806A	NC				
0x806B	Pannel_Tx_Gain	Reserved		Pannel_Drv_output_R 4gear adjustable	Pannel_DAC_Gain 0: Gainmaximum 7:Gainminimum
0x806C	Pannel_Rx_Gain	Pannel_PGA_C	Pannel_PGA_R	Pannel_Rx_Vcmi(4 gear adjustable)	Pannel_PGA_Gain (8gear adjustable)
0x806D	Pannel_Dump_Shift	Reserved		Screen original value magnification factor (2ofNpower)	
0x806E	Drv_Frame_Control	Reserved	SubFrame_DrvNum		Repeat_Num (Sampling accumulation times)
0x806F	NC	Reserved			
0x8070	NC	Reserved			
0x8071	NC	Reserved			
0x8072	NC	Reserved			
0x8073	NC	Reserved			
0x8074	NC	Reserved			

0x8075	NC	Reserved				
0x8076	NC	Reserved				
0x8077	NC	Reserved				
0x8078	NC	Reserved				
0x8079	NC	Reserved				
0x807A	Freq_Hopping_ Start	The start frequency of the frequency hopping range (Range_Ext=0when, with2KHzunits, such as50express100KHz; Range_Ext=1when, withBitFrequnit)				
0x807B	Freq_Hopping_ End	The end frequency of the frequency hopping range (Range_Ext=0when, with2KHzunits, such as150express300KHz; Range_Ext=1when, withBitFrequnit)				
0x807C	Noise_Detect_ Times	Detect_Stay_Times (one noise detection at each frequency number of inspections, recommended 2)	Detect_Confirm_Times (Determine the amount of noise after multiple noise detection 63effec recommended20)			
0x807D	Hopping_Flag	Hopping_En	Range_Ext	Dis_Force_Ref	Reserved	Detect_Time_Out (noise detection timeout in seconds)
0x807E	Hoppging_ Threshold	Fast_Hopping_Limit The interference value of the current frequency is greater than Fast_Hopping_Limit*4Only when the fast frequency hopping judgment is started, this setting is the most Xiaowei5	Hopping_Hit_Threshold (Optimal frequency selection conditions, current operating frequency interference - minimum Disturbance > set valuex4, the optimal frequency and frequency hopping are selected)			
0x807F	Noise_ Threshold	Threshold for judging interference				
0x8080	NC	Reserved				
0x8081	NC	Reserved				
0x8082	Hopping_Sensor_ Group	frequency hoppingNoiseNumber of detection segments (recommended4part)				
0x8083	Hopping_seg1_ Normalize	Seg1 NormalizeCoefficient (multiply by this number, then divide by128, to get the finalRawdata)				
0x8084	Hopping_seg1_ Factor	Seg1center pointFactor				
0x8085	Main_Clock_ Adjust	Fine-tune clock configuration, range-7~+8				
0x8086	Hopping_seg2_ Normalize	Seg2 NormalizeCoefficient (multiply by this number, then divide by128, to get the finalRawdata)				
0x8087	Hopping_seg2_ Factor	Seg2center pointFactor				
0x8088	NC	Reserved				
0x8089	Hopping_seg3_ Normalize	Seg3 NormalizeCoefficient (multiply by this number, then divide by128, to get the finalRawdata)				
0x808A	Hopping_seg3_ Factor	Seg3center pointFactor				
0x808B	NC	Reserved				

0x808C	Hopping_seg4_ Normalize	Seg4 NormalizeCoefficient (multiply by this number, then divide by128, to get the finalRawdata)	
0x808D	Hopping_seg4_ Factor	Seg4center pointFactor	
0x808E	NC	Reserved	
0x808F	Hopping_seg5_ Normalize	Seg5 NormalizeCoefficient (multiply by this number, then divide by128, to get the finalRawdata)	
0x8090	Hopping_seg5_ Factor	Seg5center pointFactor	
0x8091	NC	Reserved	
0x8092	Hopping_seg6_ Normalize	Seg6 NormalizeCoefficient (multiply by this number, then divide by128, to get the finalRawdata)	
0x8093	Key 1	Key 1Location:0-255efficient (in0means no button,4key positions are8It is expressed as an independent key when it is a multiple of)	
0x8094	Key 2	Key 2Location:0-255efficient (in0means no button,4key positions are8It is expressed as an independent key when it is a multiple of)	
0x8095	Key 3	Key 3Location:0-255efficient (in0means no button,4key positions are8It is expressed as an independent key when it is a multiple of)	
0x8096	Key 4	Key 4Location:0-255efficient (in0means no button,4key positions are8It is expressed as an independent key when it is a multiple of)	
0x8097	Key_Area	Long press to update the time (1~16s)	Button valid interval setting (one-sided):0-15efficient
0x8098	Key_Touch_Level	Touch key threshold	
0x8099	Key_Leave_Level	Touch key release threshold	
0x809A	Key_Sens	KeySens_1(button1sensitivity coefficient)	KeySens_2(button2sensitivity coefficient)
0x809B	Key_Sens	KeySens_3(button3sensitivity coefficient)	KeySens_4(button4sensitivity coefficient)
0x809C	Key_Restrain	The time to suppress the key after the finger is removed from the screen (in 100msunits),0expresses 500ms inhibition	Independent key adjacent key suppression parameter (when the maximum value exceeds the maximum value great valueKey_Restrain/16no output when pressing key), recommended setting7±2
0x809D	NC	Reserved	
0x809E	NC	Reserved	
0x809F	NC	Reserved	
0x80A0	NC	Reserved	
0x80A1	NC	Reserved	
0x80A2	NC	Reserved	
0x80A3	NC	Reserved	
0x80A4	NC	Reserved	
0x80A5	NC	Reserved	
0x80A6	NC	Reserved	
0x80A7	NC	Reserved	
0x80A8	NC	Reserved	
0x80A9	NC	Reserved	
0x80AA	NC	Reserved	
0x80AB	NC	Reserved	
0x80AC	NC	Reserved	
0x80AD	NC	Reserved	
0x80AE	NC	Reserved	
0x80AF	NC	Reserved	

0x80B0	NC	Reserved
0x80B1	NC	Reserved
0x80B2	NC	Reserved
0x80B3	NC	Reserved
0x80B4	NC	Reserved
0x80B5	NC	Reserved
0x80B6	NC	Reserved
0x80B7 ~ 0x80CA	Sensor_CH0~ Sensor_CH19	ITO SensorCorresponding chip channel number
0x80CB ~ 0x80D4	NC	Reserved
0x80D5 ~ 0x80F4	Driver_CH0~ Driver_CH31	ITO DriverCorresponding chip channel number
0x80F5 ~ 0x80FE	NC	Reserved
0x80FF	Config_Chksum	Configuration information check (0x8047arrive0x8[illegible]complement of byte sum)
0x8100	Config_Fresh	Configuration update flag (flag written by master)

c)Coordinate information

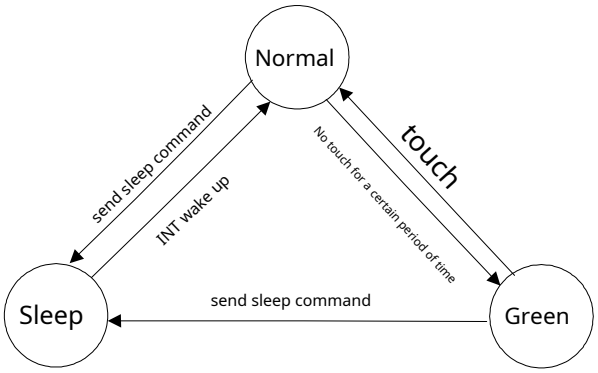
Addr	Access	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
0x8140	R	Product ID (first Byte,ASCIIcode)							
0x8141	R	Product ID (second Byte,ASCIIcode)							
0x8142	R	Product ID (third Byte,ASCIIcode)							
0x8143	R	Product ID (forth Byte,ASCIIcode)							
0x8144	R	Firmware version (HEX.low byte)							
0x8145	R	Firmware version (HEX.high byte)							
0x8146	R	x coordinate resolution (low byte)							
0x8147	R	x coordinate resolution (high byte)							
0x8148	R	y coordinate resolution (low byte)							
0x8149	R	y coordinate resolution (high byte)							
0x814A	R	Vendor_id (Current mod option information)							
0x814B	R	Reserved							
0x814C	R	Reserved							
0x814D	R	Reserved							
0x814E	R/W	buffer status	large detect	Reserved	HaveKey	number of touch points			
0x814F	R	track id							
0x8150	R	point 1 x coordinate (low byte)							
0x8151	R	point 1 x coordinate (high byte)							
0x8152	R	point 1 y coordinate (low byte)							
0x8153	R	point 1 y coordinate (high byte)							

0x8154	R	Point 1 size (low byte)
0x8155	R	point 1 size (high byte)
0x8156	R	Reserved
0x8157	R	track id
0x8158	R	point 2 x coordinate (low byte)
0x8159	R	point 2 x coordinate (high byte)
0x815A	R	point 2 y coordinate (low byte)
0x815B	R	point 2 y coordinate (high byte)
0x815C	R	point 2 size (low byte)
0x815D	R	point 2 size (high byte)
0x815E	R	Reserved
0x815F	R	track id
0x8160	R	point 3 x coordinate (low byte)
0x8161	R	point 3 x coordinate (high byte)
0x8162	R	point 3 y coordinate (low byte)
0x8163	R	point 3 y coordinate (high byte)
0x8164	R	point 3 size (low byte)
0x8165	R	point 3 size (high byte)
0x8166	R	Reserved
0x8167	R	track id
0x8168	R	point 4 x coordinate (low byte)
0x8169	R	point 4 x coordinate (high byte)
0x816A	R	point 4 y coordinate (low byte)
0x816B	R	point 4 y coordinate (high byte)
0x816C	R	point 4 size (low byte)
0x816D	R	point 4 size (high byte)
0x816E	R	Reserved
0x816F	R	track id
0x8170	R	point 5 x coordinate (low byte)
0x8171	R	point 5 x coordinate (high byte)
0x8172	R	point 5 y coordinate (low byte)
0x8173	R	point 5 y coordinate (high byte)
0x8174	R	point 5 size (low byte)
0x8175	R	point 5 size (high byte)
0x8176	R	Reserved
0x8177	R	track id
0x8178	R	point 6 x coordinate (low byte)
0x8179	R	point 6 x coordinate (high byte)
0x817A	R	point 6 y coordinate (low byte)
0x817B	R	point 6 y coordinate (high byte)
0x817C	R	point 6 size (low byte)

0x817D	R	point 6 size (high byte)
0x817E	R	Reserved
0x817F	R	track id
0x8180	R	point 7 x coordinate (low byte)
0x8181	R	point 7 x coordinate (high byte)
0x8182	R	point 7 y coordinate (low byte)
0x8183	R	point 7 y coordinate (high byte)
0x8184	R	point 7 size (low byte)
0x8185	R	point 7 size (high byte)
0x8186	R	Reserved
0x8187	R	track id
0x8188	R	point 8 x coordinate (low byte)
0x8189	R	point 8 x coordinate (high byte)
0x818A	R	point 8 y coordinate (low byte)
0x818B	R	point 8 y coordinate (high byte)
0x818C	R	point 8 size (low byte)
0x818D	R	point 8 size (high byte)
0x818E	R	Reserved
0x818F	R	track id
0x8190	R	point 9 x coordinate (low byte)
0x8191	R	point 9 x coordinate (high byte)
0x8192	R	point 9 y coordinate (low byte)
0x8193	R	point 9 y coordinate (high byte)
0x8194	R	point 9 size (low byte)
0x8195	R	point 9 size (high byte)
0x8196	R	Reserved
0x8197	R	track id
0x8198	R	point 10 x coordinate (low byte)
0x8199	R	point 10 x coordinate (high byte)
0x819A	R	point 10 y coordinate (low byte)
0x819B	R	point 10 y coordinate (high byte)
0x819C	R	point 10 size (low byte)
0x819D	R	point 10 size (high byte)
0x819E	R	Reserved
0x819F	R	KeyValue

7.Function description

7.1.Operating mode



a) Normal Mode

GT9271existNormal mode, the fastest coordinate refresh cycle is7ms-10ms(depending on the setting of the configuration information, the step length of the controllable period of the configuration information is1ms) .

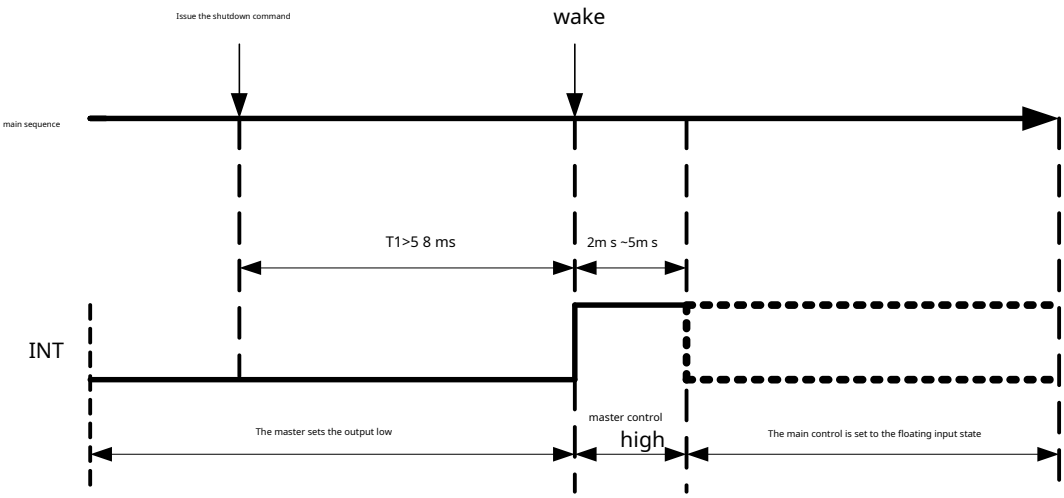
Normal modeIn the state, no touch event occurs for a period of time,GT9271will automatically transfer into Green mode, to reduce power consumption.GT9271No touch automatic entryGreen modeThe time can be set through configuration information, the range is0~15s, step by 1s.

b) Green Mode

existGreen modeDown,GT9271The scan cycle is approx.40ms, when touch action is detected, it will automatically enterNormal mode.

c) Sleep Mode

hostCPUpassI_2Ccommand to makeGT9271EnterSleep mode(need to firstINTpin output low level) . when neededGT9271 quitSleep mode, the host outputs a high level toINTFeet (host hits highINTfoot2~5ms) , after waking upGT9271 will enterNormal mode. IssuedI_2CThe time interval between sleep down command and wakeup is required to be greater than58ms.



7.2.Interrupt trigger method

when touched,GT9271Every scan cycle passesINTThe pin sends out a pulse signal to notify the masterCPURead coordinate informati hostCPUcan be accessed via the relevant register bits "INT"to set the trigger method. set to "0"Indicates that the rising edge is triggered, that is, when there is user operation,GT9271Will be at INTPort output rising edge transition, notificationCPU; set to "1"Indicates that the falling edge is triggered, that is, when there is a user operation,GT9271Will be at INTPort output falling edge transition.

7.3.sleep mode

When the display is off or in other states where you do not need to operate the touch screen, you canI_2Ccommand to makeGT9271EnterSleep modeto reduce power consumption. when neededGT9271During normal operation, the master willINTThe port outputs a high level for a period of time to wake it up. master controlGT9271Enter the sleep state and exit the sleep state timing, please refer to the specific timing7.1Festival.

7.4.Fixed configuration function

GT9271Supports the solidification configuration function. After obtaining the configuration parameters of the project,GT9271The configuration parameters of the higher version will be automatically solidified, and the configuration parameters after the configuration parameters have been solidified.GT9271only with the masterI_2CCommunication, will not receive the lower version configuration issued by the master.

7.5.Automatic calibration

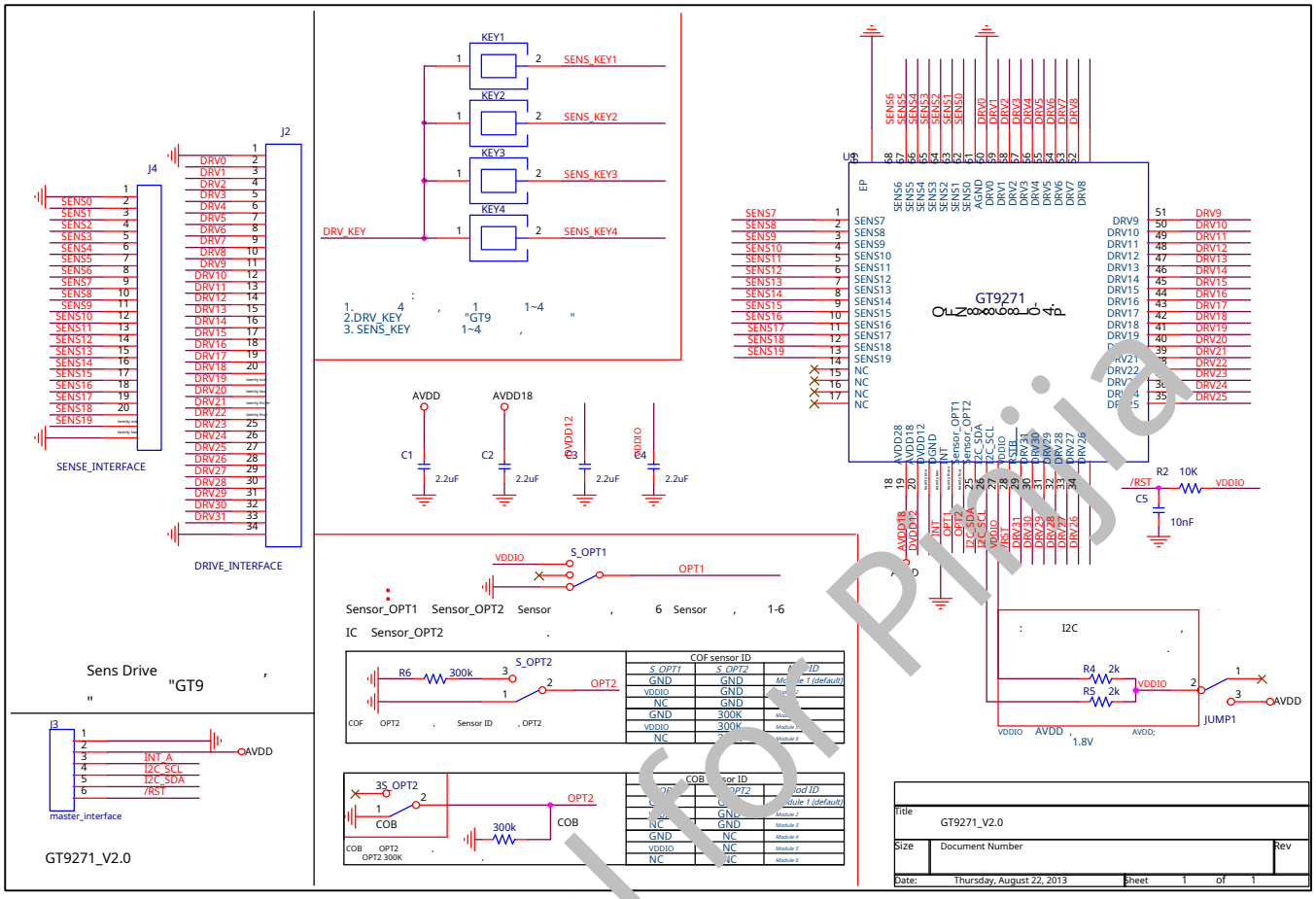
a)Initialize calibration

Different temperature, humidity and physical space structure will affect the reference value of capacitive sensor in idle state.GT9271will be initialized200ms Automatically obtain new detection benchmarks according to environmental conditions. Complete the initialization of touch screen detection.

b)Automatic temperature drift compensation

Slow changes in environmental factors such as temperature, humidity, or dust can also affect the baseline value of a capacitive sensor in an idle state.GT9271 Real-time detection of changes in data at various points, and statistical analysis of historical data to correct detection benchmarks. Thus, the influence of environmental changes on the touch screen detection is reduced.

8.Reference circuit diagram



GT9271 reference application circuit diagram

Note:

1, This circuit only represents the basic application mode, and the circuits should be adjusted according to the actual or application environment.

2, capacitors are recommendedX7R criteria.

9.Electrical Characteristics

9.1.Limit electrical parameters

(Ambient temperature is25°C)

parameter	minimum	maximum value	unit
analog powerAVDD28(refer toAGND)	2.66	3.47	V
VDDIO(refer toDGND)	1.7	3.47	V
numberI/Owithstand voltage	- 0.3	3.47	V
simulationI/Owithstand voltage	- 0.3	3.47	V
range of working temperature	- 40	85	°C
Storage temperature range	- 60	125	°C
Soldering temperature (10seconds)		300	°C
ESDprotection voltage (HB Model)	-	±2	KV

9.2.Recommended working conditions

parameter	minimum	Typical value	maximum value	unit
AVDD28	2.8	-	3.3	V
VDDIO	1.8	-	3.3	V
Operating temperature	- 20	25	85	°C

9.3. ACcharacteristic

(Ambient temperature is25°C,AVDD=2.8V,VDDIO=1.8V)

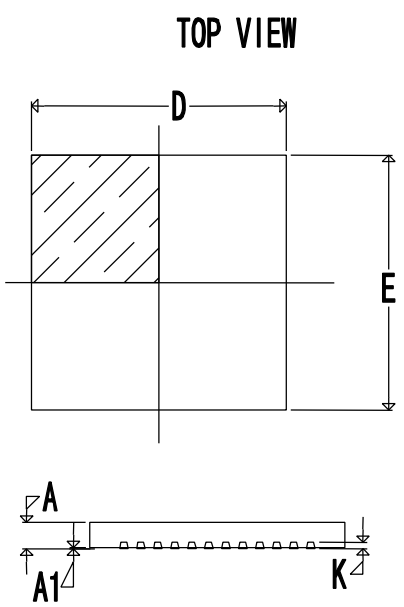
parameter	minimum	Typical value	maximum value	unit
OSCOscillation frequency	59	60	61	MHz
I/OOutput low-to-high transition time	-	-	0.5	ns
I/OOutput high-to-low transition tim	-	-	0.5	ns

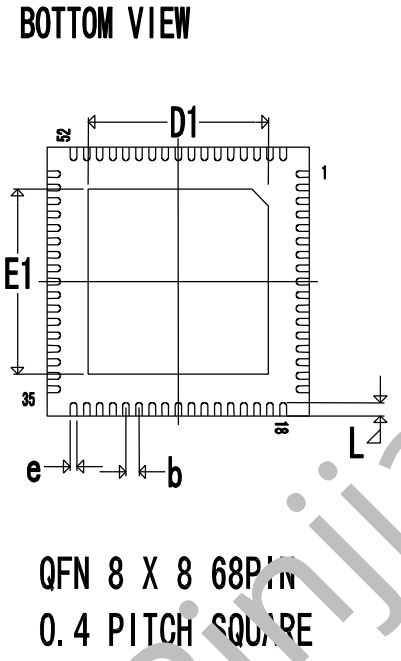
9.4. DCcharacteristic

(Ambient temperature is25°C,AVDD=2.8V,VDDIO=1.8V)

parameter	minimum	Typical value	maximum value	unit
Normal modeWorking current	-	13		mA
Green modeWorking current	-	4.5	-	mA
Sleep modeWorking current	70	-	120	uA
The digital input is a low level voltage value	- 0.3	0	0.45	V
The digital input is a high level voltage value	1.35	1.8	2.1	V

10.Product packaging





Symbol	Dimensions In Millimeter		
	Min.	Normal	Max.
A	0.70	0.75	0.80
A1	0.00	0.035	0.05
b		0.40BSC	
D		8.00BSC	
D1	5.40	5.50	5.60
E		8.00BSC	
E1	5.40	5.50	5.60
e	0.15	0.20	0.25
L	0.30	0.40	0.50
K		0.203BSC	

11.Version record

file version	Change the time	Revise
Rev.00	2013-09-04	pre-release

12.contact details

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